

# *Paspalum niquelandiae* (Poaceae: Paniceae), a New Species from the Serpentine Outcrops of Central Brazil

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**ABSTRACT.** *Paspalum niquelandiae* Filgueiras, a new species of Poaceae from the serpentine outcrops of Niquelândia, a municipality in the Brazilian state of Goiás, is described, illustrated, and compared with *Paspalum soboliferum* Chase, *P. humboldtianum* Flugge, and *P. inconstans* Chase. The conservation importance of a serpentine endemic grass flora in central Brazil is briefly discussed.

Recent fieldwork carried out in the municipality of Niquelândia, in the Brazilian state of Goiás, where serpentine soils have been reported (Brooks et al., 1990), resulted in the description of several new taxa in the Poaceae (Davidse & Filgueiras, 1993; Filgueiras et al., 1993; Filgueiras & Davidse, 1994). A new species of *Paspalum* L. from the same area is herein described, illustrated, and compared to similar species.

***Paspalum niquelandiae*** Filgueiras, sp. nov.

**TYPE:** Brazil. Goiás: Município de Niquelândia, ca. 14°18'S–48°23'W, morro pedregoso, ca. 2 km Leste da localidade de Macedo, planta crescendo entre pedras, próximo a pequena floresta de galeria, ocasional na área, 19 maio 1993, T. S. Filgueiras & F. C. de A. Oliveira 2461 (holotype, IBGE; isotypes, F, G, ICN, K, MEXU, MG, MO, R, SI, SP, US). Figure 1.

*Paspalo sobolifero* Chase spiculis ellipticis subtiliter pilosis, gluma superiore marginibus ciliatis simile, sed culmis non ramosis, ligula 0.2–0.3 mm longa, laminis 20–45 cm longis et 8–22 mm latis, communi rhachidi 9–15 cm longa, gluma superiore ciliis densis, numerosis, coroniformibus abunde differt.

Coarse, caespitose perennial. Rhizomes well developed, knotty, covered with cataphylls. Culms 120–185 cm tall, erect, unbranched in the vegetative portion, with 5–8 elongated internodes; internodes hollow, stramineous, glabrous; nodes dark, glabrous. Prophyll not seen. Leaves mostly cauline; sheaths strongly striate, glabrescent to pilose in the lower half, becoming papillose-hispid upward, the margins free, both ciliate or one glabrous toward the base;

auricles absent; ligule a minute, brown, glabrous membrane, v-shaped, 0.2–0.3 mm long; cilia at the ligular area 5–8 mm long, colorless; blades 20–45 cm long, 8–22 mm wide, flat, lanceolate, glabrescent to papillose-hispid, acuminate apically, the midrib projecting abaxially, the margins serrate-denticulate to ciliate; uppermost blade reduced, minute. Inflorescence of unilateral, ascending racemes, divergent in maturity; peduncle well exerted, 12–22 cm long, glabrous; common rachis 9–15 cm long, glabrous, cylindrical at the base, becoming 3–4-angulate upward, the margins denticulate, the internode at the base of each raceme with a tuft of colorless hairs 2–2.5 mm long; racemes 8–30, 2.5–8.5 cm long; rachis 1–1.5 mm wide, zig-zag, flat abaxially, with a central ridge adaxially, arcuate in maturity, bearing spikelets to the tip, the margins ciliate or denticulate, or both. Pedicels of unequal length, 0.1–0.3 mm long, scabrid, the apex discoid. Spikelets paired, each pair alternate on each side of the rachis, pedicelled, 2.3–3.3 mm long, 1–1.2 mm wide, broadly elliptic-lanceolate in outline, pale to purplish, dorsally compressed, abaxial, awnless, with 2 florets, disarticulating below the glume and falling as a unit; lower glume absent; upper glume slightly to strongly convex on the back, 2.3–3.3 mm long, 3-nerved, glabrous to finely appressed pubescent, the margins densely ciliate-pectinate; the cilia colorless, 0.3–0.7 mm long, with bulbous bases, the apex apiculate; lower floret sterile, consisting only of a lower lemma; lower lemma 2.2–2.9 mm long, narrower than the upper glume, 3-nerved, navicular, hyaline, with a depressed area at the base, the surface glabrous to short-pubescent, the apex glabrous to slightly ciliate; lower palea absent; upper floret 2.2–2.7 mm long, bisexual, slightly chartaceous, pale; upper lemma obscurely 5-nerved, navicular, glabrous, the surface finely papillose-striate, the apex acute; germination flap evident; upper palea 2.1–2.2 mm long, acuminate, glabrous, slightly chartaceous, the surface finely papillose-striate; lodicules 2, fleshy, conduplicate, 0.1–0.2 mm long; stamens 3; anthers 1.2–2 mm long, laterally exerted; ovary 0.5–0.8 mm long, glabrous; styles 2, separate, 1.5–1.8 mm long; stigmas 2, plumose, yellow or purplish. Caryopsis 1.8–1.9 mm long, 0.9–1 mm wide, light-colored,





Figure 1. *Paspalum niquelandiae* Filgueiras, illustrated from the type collection (Filgueiras & Oliveira 2461).  
—A. Habit. —B. Ligular area of leaf. —C. Portion of a raceme with paired spikelets. —D. Dorsal view of spikelet.  
—E. Upper floret, lemma side. —F. Upper floret, palea side.



TABLE 1. Main distinguishing characteristics of *Paspalum niquelandiae*, *P. humboldtianum*, and *P. soboliferum*.

Character	<i>P. niquelandiae</i>	<i>P. humboldtianum</i>	<i>P. soboliferum</i>
Habit	Erect	Reptant	Erect
Height (cm)	120-185	40-120	ca. 60
Culm	Unbranched	Branched	Branched
Nodes	Glabrous	Pilose	Glabrous
Ligule (mm)	0.2-0.3	1.8-3.8	2-2.5
Blades (cm × mm)	20-45 × 8-22	1-8 × 6-17	5-15 × 6-9
Common rachis (cm)	9-15	1.5-6	4-6
Number of racemes	8-30	1-8	3-7
Raceme length (cm)	2.5-8.5	4-10	2-4.5
Rachis width (mm)	1-1.5	1-3	1-1.2
Spikelet size (mm)	2.3-3.3	3-4	2.8-2.9
Cilia on glume (mm)	0.3-0.7	1.9-2.1	0.4-0.5

with persistent styler bases; embryo  $\frac{2}{5}$ - $\frac{1}{2}$  as long as the caryopsis; hilum punctate, basal,  $\frac{1}{10}$ - $\frac{1}{5}$  as long as the caryopsis.

*Paspalum niquelandiae* is morphologically most closely related to *Paspalum soboliferum* Chase because of the shape of the spikelets and especially because of the cilia on the margins of the upper glume; it differs in the unbranched culms, smaller ligule, longer blades, longer common rachis, greater number of racemes, and size and density of the cilia on the margins of the upper glume. *Paspalum soboliferum* is known only from a single plant (the holotype) from Ecuador (Hitchcock, 1927). The new species is more distantly related to *Paspalum humboldtianum* Flugge; the latter is readily distinguished by its sprawling habit, the pilose nodes, the size of the ligule, blades, and common rachis, and the number of racemes. *Paspalum humboldtianum* occurs from Mexico to Argentina (Chase, 1929). Table 1 summarizes the main differences among *P. niquelandiae*, *P. humboldtianum*, and *P. soboliferum*. It is evident from Table 1 that these species form a trio of closely related species with some overlapping characteristics, but whose distinctiveness is also readily apparent.

The spikelet shape and the ciliate lower lemma remotely link *Paspalum niquelandiae* to *P. inconstans* Chase, a species from Bolivia, Ecuador, and Peru. The latter is of smaller stature (culms 50 to 60 cm high), has both terminal and axillary racemes, and possesses a lower number of racemes (1 to 8, but commonly 2 to 5). A further distinguishing characteristic is the presence of a lower glume in the lower spikelets of *P. inconstans* (occasionally lacking in some spikelets). In addition, the cilia on the lower lemma of *P. inconstans* are smaller and much less dense than in *P. niquelandiae*.

The classification of *Paspalum niquelandiae* is not yet clear. It is obviously related to a group of species included by Chase in her unpublished monograph of the South American species of *Paspalum* [accessible from the Hitchcock & Chase Grass Library of the Department of Botany, Smithsonian Institution, Washington, D.C., U.S.A.] in subgenus *Ceresia* (Persoon) Reichenbach. This group of species (which includes *Paspalum bicilium* Mez, *P. carinatum* Kunth, *P. polyphyllum* Nees, among others) has a characteristic upper glume with conspicuous marginal cilia. The inclusion of *P. niquelandiae* in subgenus *Ceresia* is not acceptable because this would make the subgenus exceedingly heterogeneous. Although related to some species in subgenus *Ceresia*, *P. niquelandiae* is best left ungrouped until more convincing evidence of relationships becomes available.

*Paspalum niquelandiae* is known from two populations in the municipality of Niquelândia in the Brazilian state of Goiás. It is apparently restricted to the serpentine outcrops in the area. It grows in scattered clumps among rocks and boulders, near the edge of some gallery forests, but was never found inside the gallery forest itself. Although the clumps seen were rather robust and, therefore, easy to spot, large populations of the species were never located.

This is the third species of *Paspalum* described from the locality of Macedo in Niquelândia. The other two are *P. longiaristatum* Davidse & Filgueiras (Davidse & Filgueiras, 1993) and *P. biaristatum* Filgueiras & Davidse (Filgueiras & Davidse, 1994). *Ophiochloa* Filgueiras, Davidse & Zuloaga, a panicoid grass genus, has also been recently described from the same area (Filgueiras et al., 1993). The discovery of so many new taxa in such a small area (ca. 3 km<sup>2</sup>) in central Brazil suggests that Niquelândia is a center of high plant diversity and



endemism, primarily due to the presence of serpentine soils, with their high concentrations of nickel, chromium, cobalt, and other minerals (Brooks, 1987).

The presence of a highly specialized flora in Niquelândia is of utmost concern because the area is the center of the largest nickel mining and smelting operation in Brazil (Brooks et al., 1990). There is not a single conservation unit in the area to grant legal protection to this unique flora. A detailed botanical survey should be undertaken in the region to assess the diversity of the entire flora and its level of endemism. The conservational implications of the presence of such a peculiar flora in Niquelândia will be addressed in a forthcoming publication.

The specific epithet refers to the town of Niquelândia, in whose municipality the new species was collected.

*Paratypes.* BRAZIL. **Goiás:** município de Niquelândia, ca. 1 km Leste da localidade de Macedo, morro pedregoso, 19 maio 1993, T. S. Filgueiras & F. C. de A. Oliveira 2456 (IBGE, RB, UB), 4 ago. 1992, T. S. Filgueiras & R. D. Lopes 2427 (B, IBGE).

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